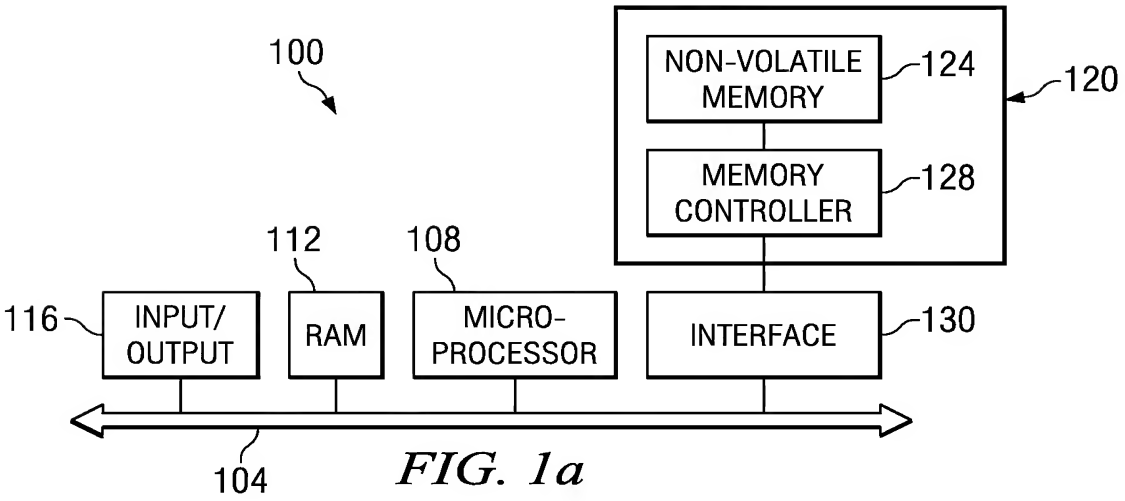
100
NON-VOLATILE MEMORY
124
120
MEMORY CONTROLLER
128
112
108
116
INPUT/ OUTPUT
RAM
MICRO-PROCESSOR
INTERFACE
130
104

FIG. 1a

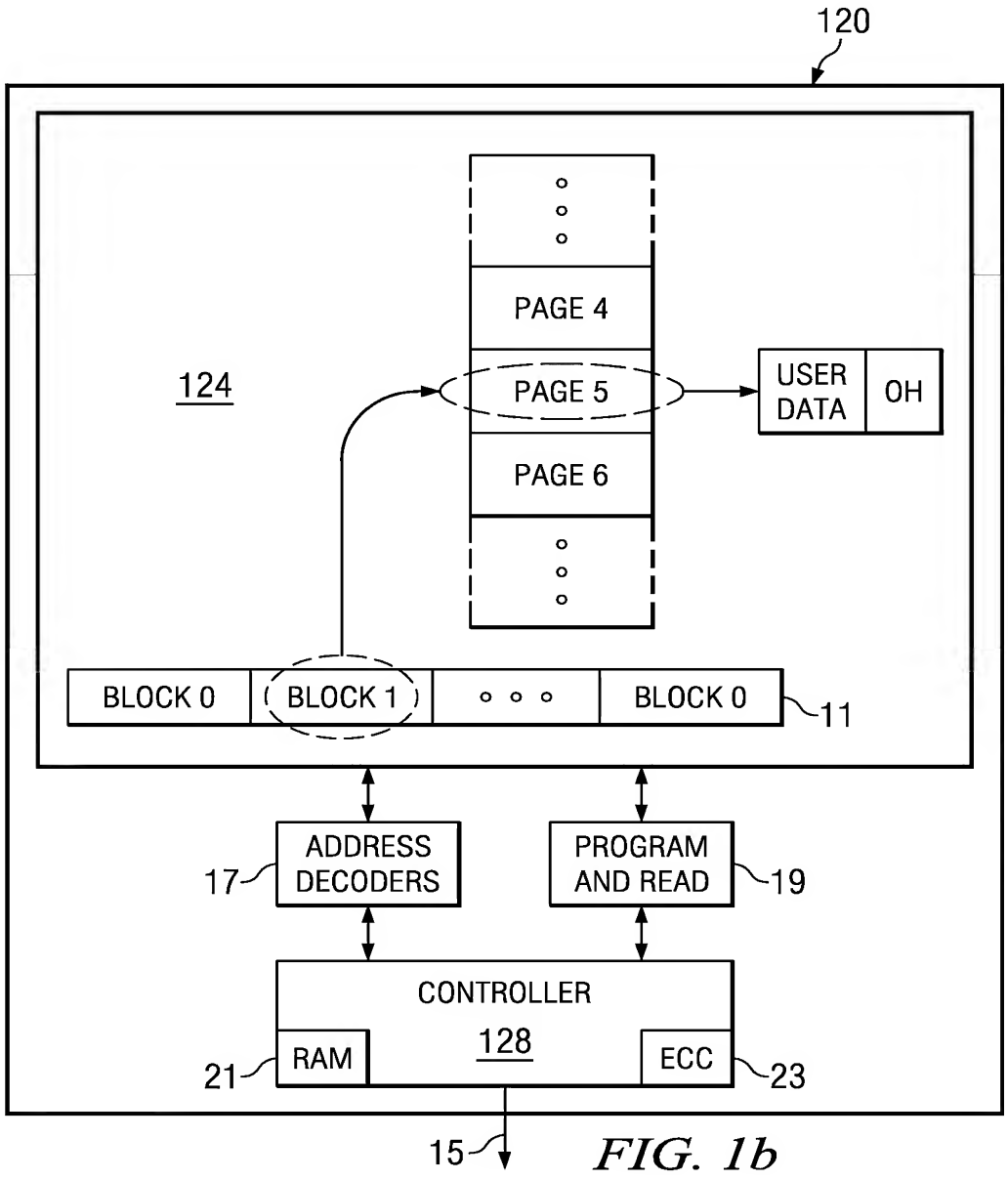
120
PAGE 4
124
PAGE 5
USER DATA
OH
PAGE 6
BLOCK 0
BLOCK 1
BLOCK 0
11
ADDRESS DECODERS
17
PROGRAM AND READ
19
CONTROLLER
128
RAM
21
ECC
23
15

FIG. 1b

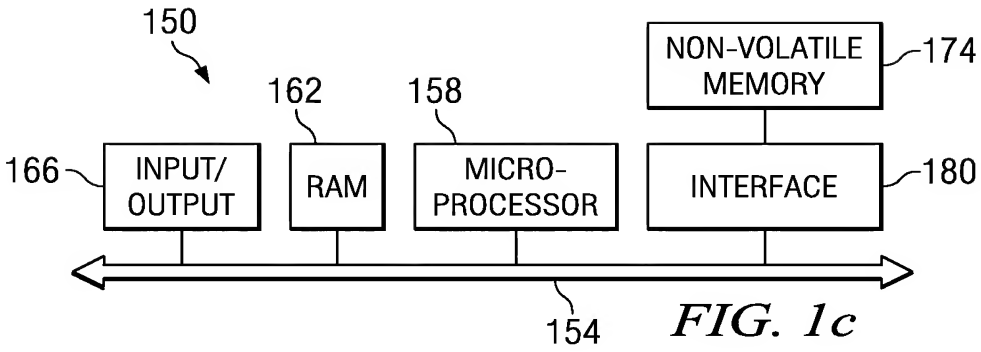
150
162
158
NON-VOLATILE MEMORY
174
166
INPUT/ OUTPUT
RAM
MICRO-PROCESSOR
INTERFACE
180
154

FIG. 1c

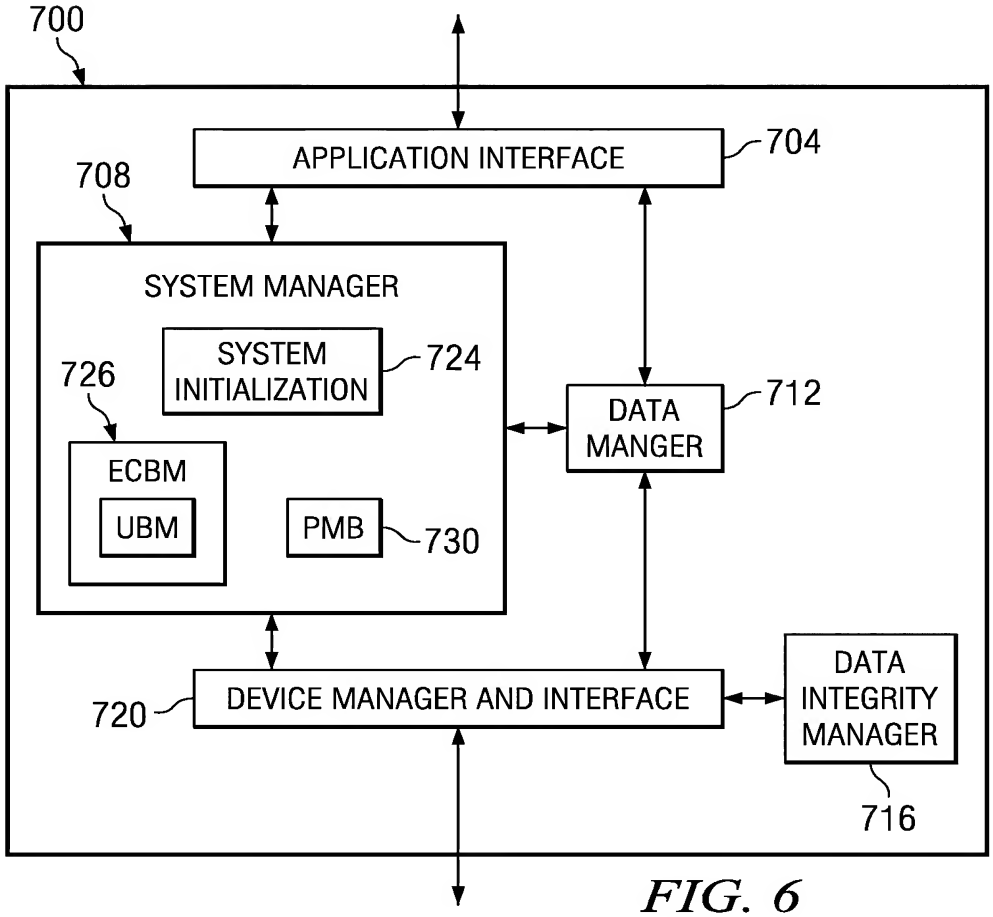
700
APPLICATION INTERFACE
704
708
SYSTEM MANAGER
SYSTEM INITIALIZATION
724
726
DATA MANGER
712
ECBM
UBM
PMB
730
720
DEVICE MANAGER AND INTERFACE
DATA INTEGRITY MANAGER
716

FIG. 6

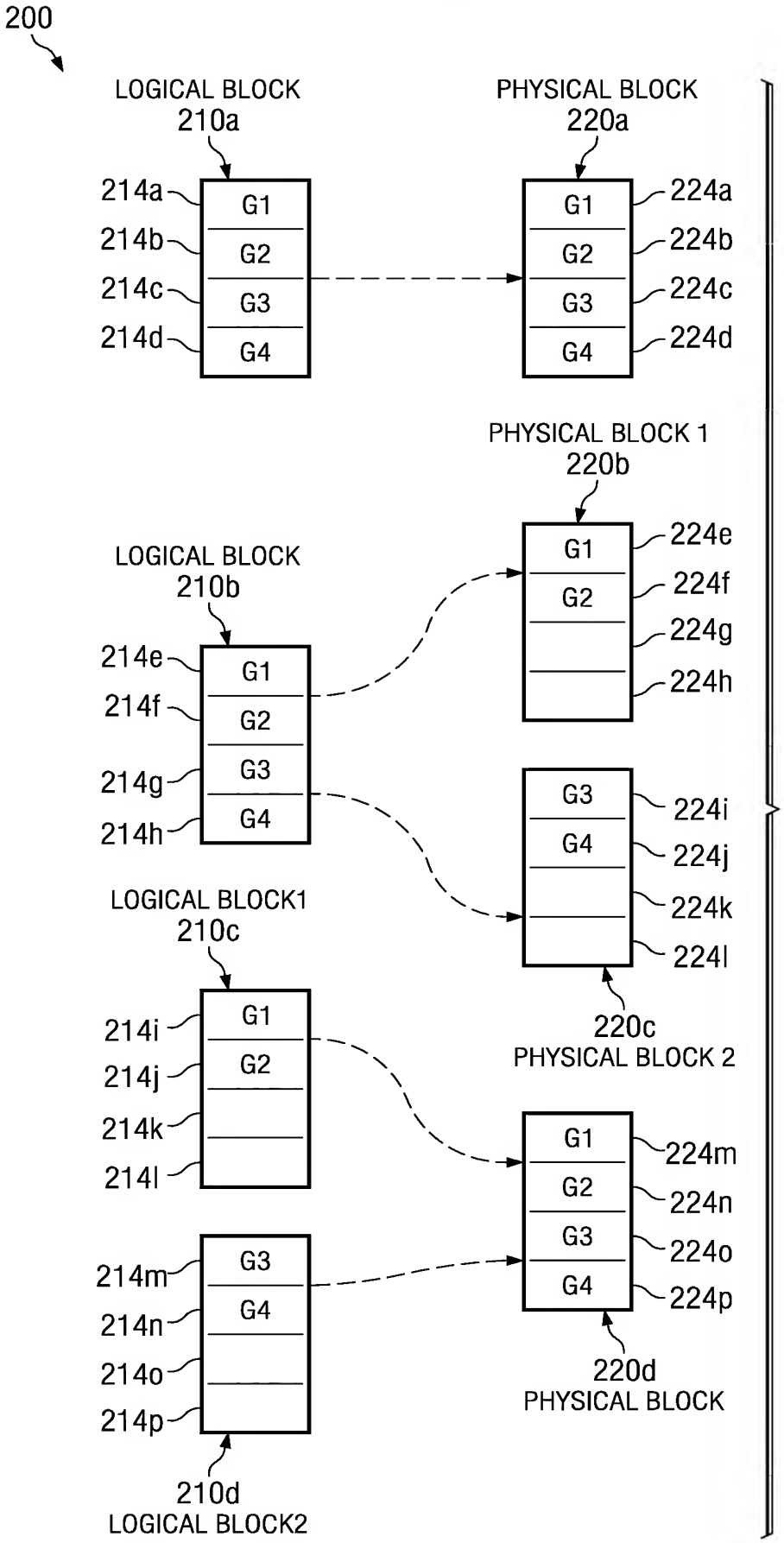
200
LOGICAL BLOCK
210a
214a
214b
214c
214d
G1
G2
G3
G4
PHYSICAL BLOCK
220a
224a
224b
224c
224d
PHYSICAL BLOCK 1
220b
224e
224f
224g
224h
LOGICAL BLOCK
210b
214e
214f
214g
214h
224i
224j
224k
224l
220c
PHYSICAL BLOCK 2
LOGICAL BLOCK1
210c
214i
214j
214k
214l
224m
224n
224o
224p
214m
214n
214o
214p
220d
PHYSICAL BLOCK
210d
LOGICAL BLOCK2

FIG. 2

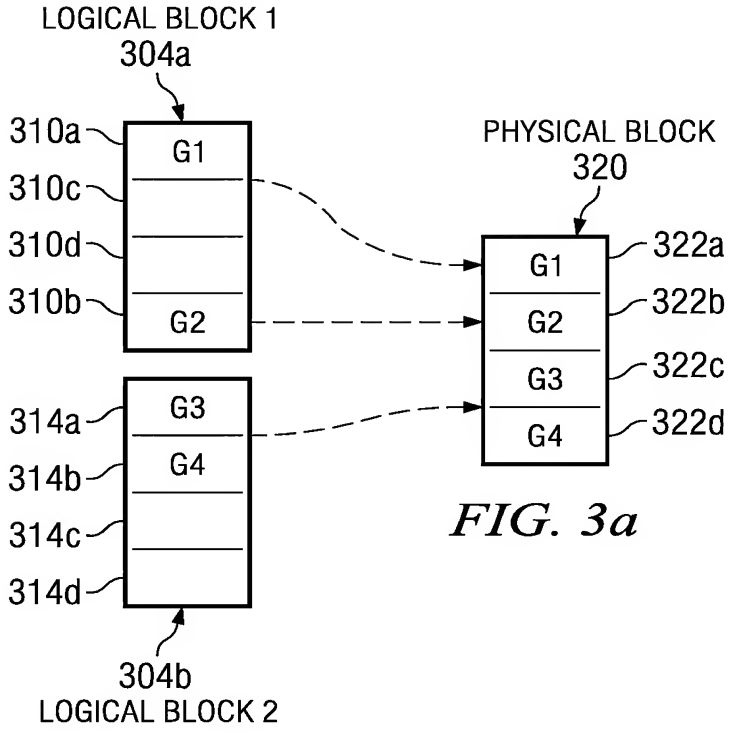
LOGICAL BLOCK 1
304a
310a
310c
310d
310b
G1
G2
PHYSICAL BLOCK
320
322a
322b
322c
322d
G1
G2
G3
G4
314a
314b
314c
314d
G3
G4
304b
LOGICAL BLOCK 2

FIG. 3a

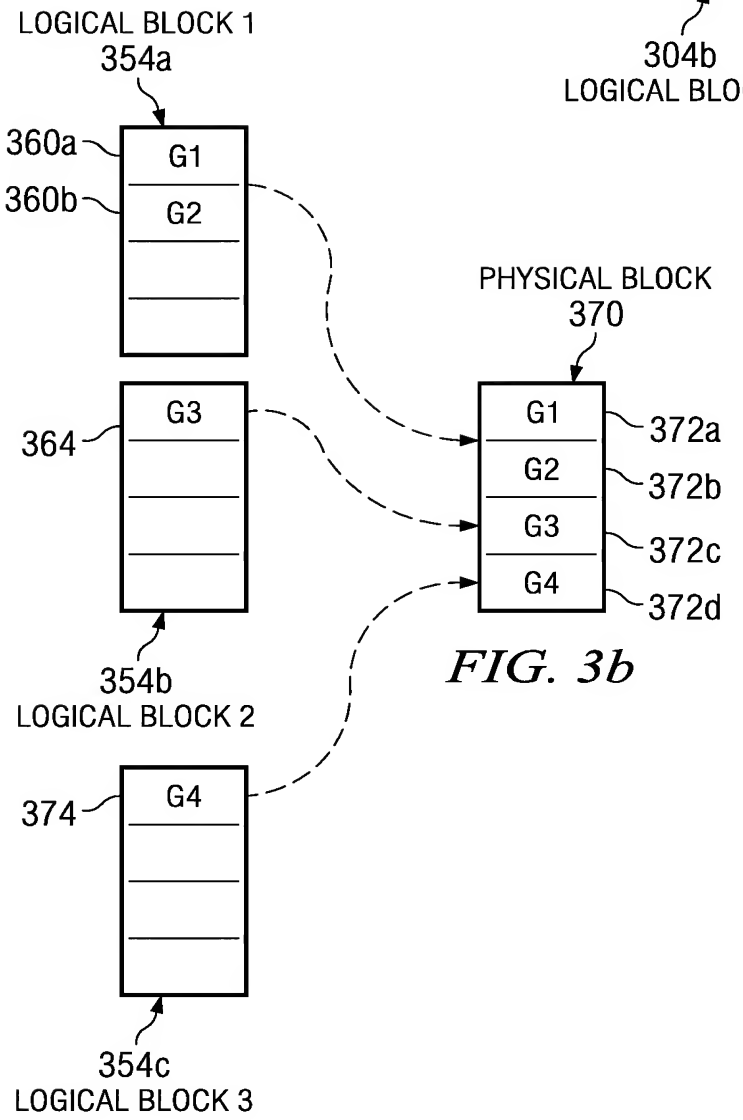
LOGICAL BLOCK 1
354a
360a
360b
G1
G2
PHYSICAL BLOCK
370
372a
372b
372c
372d
G1
G2
G3
G4
364
G3
354b
LOGICAL BLOCK 2
374
G4
354c
LOGICAL BLOCK 3

FIG. 3b

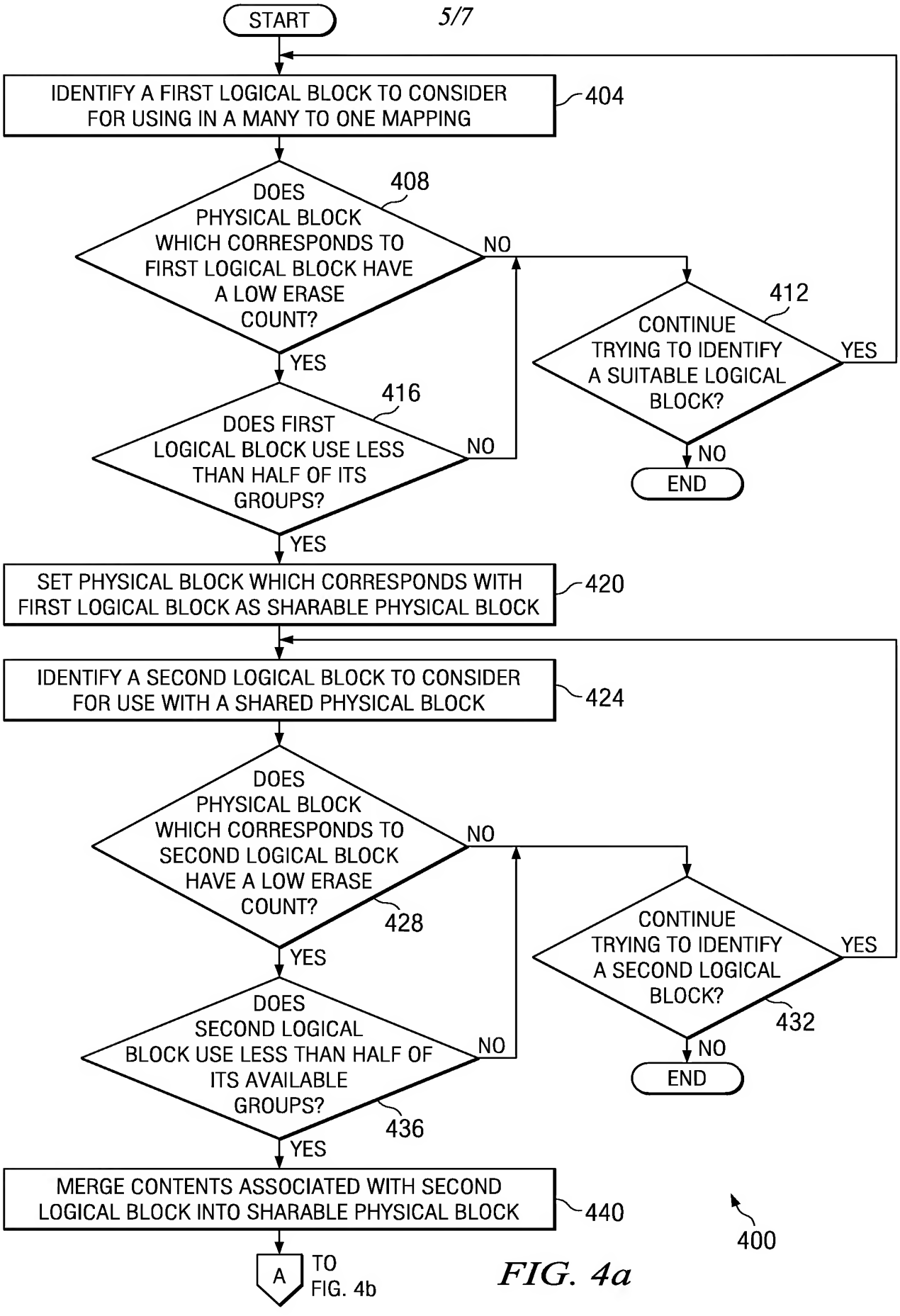
START
IDENTIFY A FIRST LOGICAL BLOCK TO CONSIDER FOR USING IN A MANY TO ONE MAPPING
404
DOES PHYSICAL BLOCK WHICH CORRESPONDS TO FIRST LOGICAL BLOCK HAVE A LOW ERASE COUNT?
408
NO
YES
CONTINUE TRYING TO IDENTIFY A SUITABLE LOGICAL BLOCK?
412
YES
NO
END
DOES FIRST LOGICAL BLOCK USE LESS THAN HALF OF ITS GROUPS?
416
NO
YES
SET PHYSICAL BLOCK WHICH CORRESPONDS WITH FIRST LOGICAL BLOCK AS SHARABLE PHYSICAL BLOCK
420
IDENTIFY A SECOND LOGICAL BLOCK TO CONSIDER FOR USE WITH A SHARED PHYSICAL BLOCK
424
DOES PHYSICAL BLOCK WHICH CORRESPONDS TO SECOND LOGICAL BLOCK HAVE A LOW ERASE COUNT?
428
NO
YES
CONTINUE TRYING TO IDENTIFY A SECOND LOGICAL BLOCK?
432
YES
NO
END
DOES SECOND LOGICAL BLOCK USE LESS THAN HALF OF ITS AVAILABLE GROUPS?
436
NO
YES
MERGE CONTENTS ASSOCIATED WITH SECOND LOGICAL BLOCK INTO SHARABLE PHYSICAL BLOCK
440
A
TO FIG. 4b
400

FIG. 4a

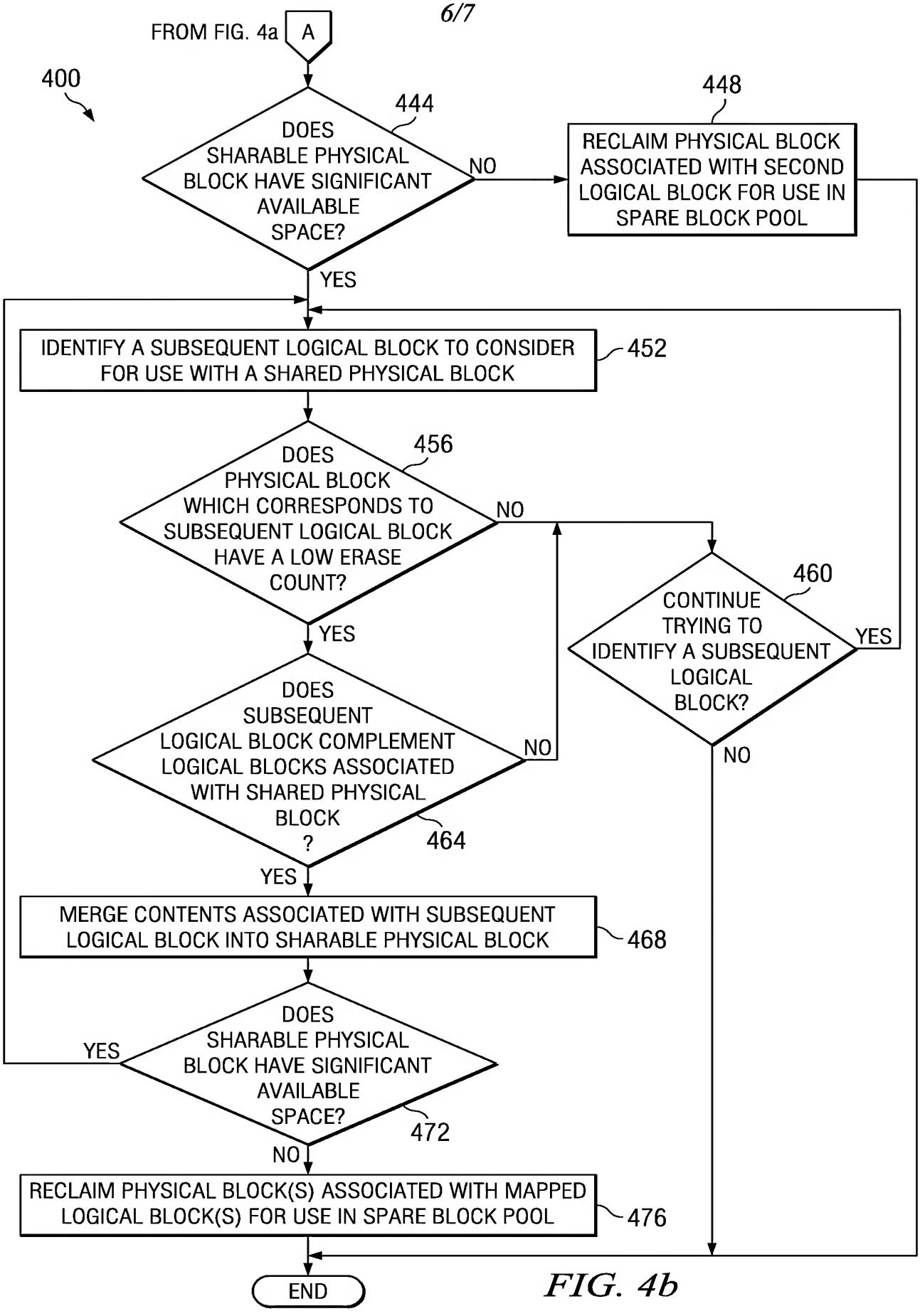
FROM FIG. 4a
A
400
444
DOES SHARABLE PHYSICAL BLOCK HAVE SIGNIFICANT AVAILABLE SPACE?
NO
448
RECLAIM PHYSICAL BLOCK ASSOCIATED WITH SECOND LOGICAL BLOCK FOR USE IN SPARE BLOCK POOL
YES
IDENTIFY A SUBSEQUENT LOGICAL BLOCK TO CONSIDER FOR USE WITH A SHARED PHYSICAL BLOCK
452
456
DOES PHYSICAL BLOCK WHICH CORRESPONDS TO SUBSEQUENT LOGICAL BLOCK HAVE A LOW ERASE COUNT?
NO
YES
460
CONTINUE TRYING TO IDENTIFY A SUBSEQUENT LOGICAL BLOCK?
YES
NO
DOES SUBSEQUENT LOGICAL BLOCK COMPLEMENT LOGICAL BLOCKS ASSOCIATED WITH SHARED PHYSICAL BLOCK ?
464
NO
YES
MERGE CONTENTS ASSOCIATED WITH SUBSEQUENT LOGICAL BLOCK INTO SHARABLE PHYSICAL BLOCK
468
DOES SHARABLE PHYSICAL BLOCK HAVE SIGNIFICANT AVAILABLE SPACE?
472
YES
NO
RECLAIM PHYSICAL BLOCK(S) ASSOCIATED WITH MAPPED LOGICAL BLOCK(S) FOR USE IN SPARE BLOCK POOL
476
END

FIG. 4b

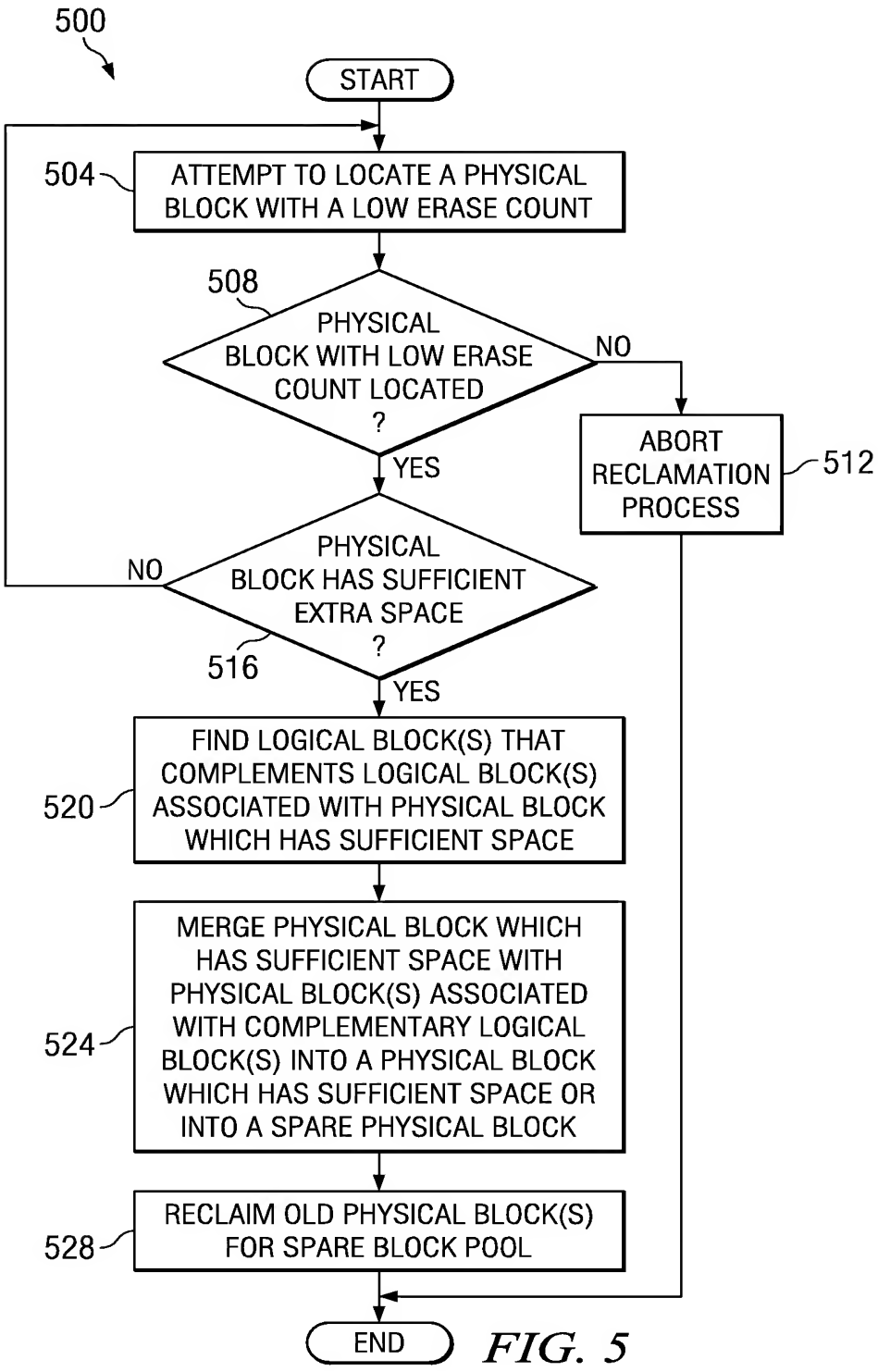
500
START
504
ATTEMPT TO LOCATE A PHYSICAL BLOCK WITH A LOW ERASE COUNT
508
PHYSICAL BLOCK WITH LOW ERASE COUNT LOCATED ?
NO
YES
ABORT RECLAMATION PROCESS
512
PHYSICAL BLOCK HAS SUFFICIENT EXTRA SPACE ?
NO
516
YES
FIND LOGICAL BLOCK(S) THAT COMPLEMENTS LOGICAL BLOCK(S) ASSOCIATED WITH PHYSICAL BLOCK WHICH HAS SUFFICIENT SPACE
520
MERGE PHYSICAL BLOCK WHICH HAS SUFFICIENT SPACE WITH PHYSICAL BLOCK(S) ASSOCIATED WITH COMPLEMENTARY LOGICAL BLOCK(S) INTO A PHYSICAL BLOCK WHICH HAS SUFFICIENT SPACE OR INTO A SPARE PHYSICAL BLOCK
524
RECLAIM OLD PHYSICAL BLOCK(S) FOR SPARE BLOCK POOL
528
END

FIG. 5